

NOVEMBER/DECEMBER 2025

**23UCA31 — DATA STRUCTURE AND
ALGORITHMS**

Time : Three hours

Maximum : 75 marks

SECTION A — (10 × 2 = 20 marks)

Answer ALL questions.

1. What is a linked list?
2. When doubly linked list can be represented as circular linked list?
3. State the applications of Queue.
4. Define Stack with example.
5. What is meant by Traversing?
6. Define Expression trees.
7. Mention any two applications of Graphs.
8. Define an In-Degree of a Graph.



9. What are the various factors to be considered in a Sorting algorithm?

10. Define hashing.

SECTION B — ($5 \times 5 = 25$ marks)

Answer ALL the questions.

11. (a) Enumerate the merits and demerits of an array based implementation of lists.

Or

(b) Narrate any two basic operations performed on List.

12. (a) Exemplify the DeQueue with its operations.

Or

(b) Explain how to evaluate arithmetic expressions using stacks.

13. (a) Draw the expression tree and find the infix and postfix expressions for the following prefix expression :

$\times - A B + \times C D / E F$.

Or

(b) Briefly describe the importance of B- Tree.

14. (a) Explain the various representation of Graph with suitable example.

Or

(b) With an example, explain the Euler Circuits.

15. (a) Write short notes on Hashing Functions.

Or

(b) Illustrate the algorithm for Binary Search.

SECTION C — ($3 \times 10 = 30$ marks)

Answer any THREE questions.

16. Explain the operations of Circularly Linked Lists.

17. Write the Pseudo code for Infix and postfix traversal of an expression.

18. Exemplify the concept of Threaded Binary Tree.

19. Illustrate the Breadth-First Tree Traversals with Pseudo code.

20. Design an algorithm for Bubble Sort with an example.

